
Appendix G

Surface Reclamation Plan

Table of Contents

	Page
1.0 INTRODUCTION	1
1.1 Background.....	1
1.2 Authority.....	2
2.0 SITE-SPECIFIC RECLAMATION PLANS.....	3
2.1 Introduction	3
2.2 Plan Components.....	3
2.3 Additional Instances Requiring Site-Specific Reclamation Plan Submission	6
3.0 TIMEFRAMES, SUCCESS CRITERIA, AND REQUIREMENTS	7
3.1 Interim Reclamation	7
3.1.1 Phase I Interim Reclamation	7
3.1.2 Phase II Interim Reclamation	10
3.2 Final Reclamation.....	13
3.2.1 Timeframe (Final)	13
3.2.2 Success Criteria (Final)	14
3.2.3 Reclamation Requirements (Final).....	15
4.0 RECLAMATION STATUS REPORTS.....	18
4.1 Timeframe for Reclamation Status Report Submission	18
4.2 Status Report Components	18
5.0 SEED MIXES	20
5.1 Seed Mix Selection, Application Methods, and Rates.....	20
5.2 Acceptable Seeding Dates	26
6.0 MODIFICATIONS OF STANDARD RECLAMATION SUCCESS CRITERIA AND SEED MIXES	27
6.1 Greater Sage-Grouse Habitat	27
6.2 Habitat for Special Status Plant Species.....	27
6.3 Areas of Critical Environmental Concern (ACEC) and Remnant Vegetation Associations (RVA)	27
7.0 SUPPLEMENTAL INFORMATION	29
7.1 Acronyms	29
7.2 Contact Information.....	31
7.3 References	31
7.4 Glossary	31

List of Tables

Table G-1. Timeline for Reclamation Activities 17

Table G-2. Seed Mixes Tied to Range Sites within the WRFO 21

Table G-3. Standard Seed Mixes (50 seeds per square foot application rate) 22

Table G-4. Alternate Forb Species 25

Table G-5. Acceptable Seeding Dates Based on Vegetation Community 26

1.0 Introduction

1.1 Background

The 2007 revised Onshore Order #1 requires oil and gas operators to incorporate a reclamation plan into its Application for Permit to Drill, which the Bureau of Land Management (BLM) utilizes to determine the overall effects of the proposal. These plans describe the operator's practices and procedures, which it will implement to ensure effective reclamation of disturbed lands occurs. The purpose of this document is three fold. First, it provides the minimum information and operation standards that the White River Field Office (WRFO) expects within reclamation plans, with the level of detail necessary to assess the technical adequacy and land use plan conformance of those plans. Secondly, the document establishes specific criteria the WRFO will implement which will determine if reclamation is successful. And finally the document identifies a number of techniques and methodologies that can be incorporated into a site specific reclamation plan which the WRFO has seen successfully use by operators in the past to achieve successful reclamation. The WRFO contains a diversity of site characteristics (i.e., elevation, topography, precipitation, and soil type) present across the 2.6 million acres within the WRFO requiring a standards-based approach to reclamation rather than a one-size fits-all procedure-based approach. The following standards are specific to the WRFO and are intended to complement current reclamation guidance found in the "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (The Gold Book) and other BLM policy and guidance.

All surface disturbing activities approved on BLM lands administered by the WRFO will be subject to reclamation standards described in this document. It is important to note that reclamation success criteria expressed in this document are considered standards that, through the Authorized Officer (AO), are subject to adaptation depending on site-specific reclamation challenges (i.e., physical or biological constraints beyond the operator's control). WRFO will consider authorizing well-designed reclamation experiments and trials outside established strategies that may serve as the basis for enhancing reclamation efficacy or efficiency consistent with BLM's reclamation objectives.

Standards-based reclamation focuses on using the desired end condition as the ultimate determinant of reclamation success. Reclamation procedures are designed to provide soil stabilization while expediting the return of a functional and desirable plant community. Reclamation plans submitted are to be location specific and when approved strictly adhered to unless a written exception is granted by the AO. There are numerous other sources of guidance (e.g., Best Management Practices) to aid operators in achieving reclamation success. Industry is encouraged to propose analogous innovative approaches to help meet or exceed BLM reclamation standards.

Additional reclamation planning, requirements, implementation methods, and monitoring guidance can be found in the following references or on the WRFO's webpage:

- Revised Onshore Order Number 1 (Effective May 7, 2007)
- Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)
- Bureau of Land Management – Colorado Standards for Public Land Health

- BLM Core Terrestrial Indicators and Methods Technical Note 440 and Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I and II: Quick Start. Methods discussed in BLM Technical Reference 1730-1 may also be used after BLM pre-approval.
- Natural Resource Conservation Service (NRCS) Range Site Descriptions
- Once available from the NRCS, the WRFO will transition from using range sites to the updated Ecological Site Descriptions.

1.2 Authority

The BLM is required by law to ensure that authorized actions are carried out in a manner that does not result in “permanent impairment of the productivity of the land or the quality of the environment” (Federal Land Policy and Management Act [FLPMA], 1976). In order to promote a consistent and science-based approach to reclamation, this document identifies minimum information and operational requirements and performance-based criteria that are expected to satisfy WRFO’s responsibilities under FLPMA and Colorado’s Public Land Health Standards.

The Mineral Leasing Act of 1920 (30 U.S.C. § 181-287), amended by the Federal Onshore Oil and Gas Leasing Reform Act of 1987, PL 100-203, among other things, authorizes the Secretary of Interior to regulate all surface-disturbing activities associated with any lease and to impose mitigation and reclamation measures in order to “conserve surface resources.”

The White River 1997 Record of Decision/Resource Management Plan (ROD/RMP) specifies that surface disturbance be promptly reclaimed to the satisfaction of the Area Manager and reclamation be implemented concurrent with construction and site operations to the fullest extent possible.

BLM regulations established in 43 C.F.R. §3160 (i.e., Onshore Oil and Gas Order Number 1) require that a reclamation plan be submitted with the Surface Use Plan in the Application for Permit to Drill (APD). The Onshore Order Number 1, Section XII. B., in referencing Section III.D.4.j., requires that surface reclamation plans must be designed to return the disturbed areas to productive use and meet the objectives of the land and resource management plan.

2.0 Site-Specific Reclamation Plans

2.1 Introduction

As described in Onshore Order Number 1(Revised 2007), project specific reclamation plans are required for any surface disturbing activity related to oil and gas activities. All reclamation plans must be consistent with current standards and RMP goals and objectives for all land management designations throughout the Field Office. Project placement and planning should be designed to optimize reclamation success and prevent impacts to the surrounding area. Exceptions may be warranted for wells on existing multi-well pads with approved reclamation plans. The Code of Federal Regulations (CFR), at 43 CFR 2800 describes requirements for surface use plans and associated reclamation plans for rights-of-way (ROW). Reclamation plans must be designed to return the disturbed area to a condition that meets the objectives of the White River 1997 ROD/RMP. Reclamation plans will address surface reclamation and/or stabilization of all disturbed areas for both the interim reclamation of all areas not needed for production and Final reclamation of locations (after plugging) or linear facilities (upon completion of construction). Such plans must include the reclamation timelines, configuration of the reshaped topography, drainage systems, segregation of spoil materials (stockpiles), storage, and redistribution of topsoil, soil treatments, seeding or other steps to stabilize soils and reestablish vegetation, and weed control. The reclamation plan should be updated and re-submitted for approval if any changes occur that may influence reclamation. The Reclamation Plan is part of the Surface Use Plan (SUP). An APD may have additional site specific Conditions of Approval (COAs) attached by the BLM.

2.2 Plan Components

Project specific reclamation plans submitted to the WRFO must be sufficient to accurately characterize surface and site conditions prior to disturbance. Plan components should include at a minimum:

1. Documentation of surface and site conditions prior to disturbance:
 - a. Photos of area to be disturbed, taken from permanent photo points. At least one photo should be taken from a repeatable point at a reasonable/appropriate distance to provide an overview of the site to be developed. Photo points should be repeatable, located where they are less likely to be disturbed, and provide an overview of the site (e.g., from the center of the pad toward the ends and/or from the corners of the pad inward toward the center or inward/outward to/from the four cardinal directions). Additional photo points to capture entire area of disturbance may be included.
 - b. Pre-disturbance terrain and contour.
 - c. Soil type, texture, erosion potential, average topsoil depth and characteristics (i.e., physical and chemical properties), and average depth to bedrock by soil type.
 - d. If topsoil is expected to be stored for more than six months, BLM suggests that its physical and chemical characteristics should be measured to determine pre-disturbance baseline values and to identify potential changes during storage. The topsoil should be retested during Phase II interim reclamation using the same baseline methods to determine if there is a need for soil amendments. Suggested parameters for testing include pH, organic carbon, fertility (nitrogen, phosphorus, and potassium), aeration porosity, water-holding or available water capacity, bulk density, hydraulic

- conductivity, and electrical conductivity. An adequate number of samples should be taken to ensure that changes in soil attributes can be detected.
- e. Pre-disturbance ground cover, including surface rock and vegetation composition (by species). Data must be gathered using quantitative methods to measure the six Core Terrestrial Indicators and Methods in BLM Technical Note 440. Approved methods are found in Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I and II: Quick Start or at the Jornada Experimental Range website (<http://jornada.nmsu.edu/education/training-materials>), which provides informational videos on methods such as line-point and canopy gap. They have developed a simple, statistically rigorous one-transect line-point intercept method that measures all six indicators. Other data collection methods such as those described in BLM Technical Reference 1730-1 may be submitted as part of the reclamation plan for approval by the BLM.
 - f. Pre-disturbance survey identifying and quantifying noxious and/or invasive weeds within the area of direct and indirect use (project disturbance and a 330 foot buffer), including all access roads, pipelines, or other associated surface disturbance.
 - g. The NRCS range site(s) or associated reference site(s) (identified and mapped). Reference sites can be used when the operator and the BLM agree that the site does not reflect the range site. The reference site must be approved by the BLM. The operator must provide statistically valid quantitative reference site measurements of vegetation cover, vegetation composition, woody plant density, and percent bare ground. Pre-disturbance vegetation data must be gathered using quantitative methods as explained above in 2.2e.
2. Construction practices and Phase I interim reclamation drainage design (including a plan view figure or diagram):
 - a. Pipeline construction practices that define the progression, method of installation such as using a plow, trencher, or excavator and a description of soil management practices during construction including storage of topsoil, subsoil, and methods for bedding the pipeline.
 - b. Note: Topsoil will only be used as a seed bed for reclamation. Under no circumstances will topsoil be used as a pipe bedding material, to fill sacks for trench breakers, or for any other use as a construction material.
 - c. Drainage systems including any stormwater measures, diversion ditches, catchment ditches, infiltration ponds, culverts, low-water crossings, or waterbars.
 - d. Planned disturbance including locations of stockpiles, stormwater measures, production facilities pads, or other needed infrastructure.
 - e. Identify and describe management of waste materials (e.g., cuttings management/disposal, contaminated soils).
 3. Weed management:
 - a. Weed management plans to address treatment from pre-disturbance, the life of the project, and through final abandonment including a summary of methods used to monitor, treat, and report the presence of noxious or undesirable invasive weeds within the project area and surrounding area (i.e., within 330 feet of areas of direct use). Ensure that weed treatments are developed and conducted in an effective manner compatible with approved seed mixes. .

- 1 b. Plans for washing all vehicles and equipment to prevent the spread of weeds. Plans
2 must address weed free zones identified in the White River 1997 ROD/RMP. Weed free
3 zones are areas designated for intensive weed management through cooperation with
4 private land owners, and state and county governments. Maps of designated weed free
5 zones are in the White River 1997 ROD/RMP.
- 6 4. Monitoring methods:
 - 7 a. The location of permanent photo points, which should show all aspects of planned
8 surface disturbance and the adjacent undisturbed landscape.
 - 9 b. Reclamation monitoring plans must address all aspects of success criteria and include
10 proposed methods, sampling design, inspection frequency, and reporting schedules. The
11 operator will consult with the project lead (NRS/Realty Specialist) when developing the
12 monitoring plan. Vegetation monitoring, completed by qualified personnel, should
13 occur within the growing season and begin the second year after reclamation efforts are
14 initiated and every third year after that until final abandonment. The BLM may require
15 more frequent monitoring of reclamation if necessary. Vegetation monitoring reports
16 should be submitted to the BLM with the reclamation status report by January 1st.
17 Vegetation monitoring must also be completed and reported in conjunction with the
18 final abandonment notice.
- 19 5. Interim reclamation (Phase I & II):
 - 20 a. Soil stabilization methods and stormwater management practices.
 - 21 b. Topographic diagram showing interim reclamation footprint including the extent of
22 recontouring (Phase II only), any areas put into final contours, and the means employed
23 to maximize the extent of disturbance available for effective reclamation (e.g.,
24 placement of production facilities).
 - 25 c. Topsoil management and stabilization practices.
 - 26 d. Surface preparation before and after seeding, including but not limited to: depth of
27 ripping, soil pocking, disking, mulching, incorporation of woody material, etc.
 - 28 e. Seeding methods and seed mix.
 - 29 f. Methods for managing livestock and wild horse influences.
- 30 6. Final reclamation:
 - 31 a. Diagram showing proposed final recontouring.
 - 32 b. Proposed seeding methods and seed mixes (updated to match current approved mixes)
 - 33 c. Proposed/desired phased reclamation (e.g., of access road) to facilitate maintenance and
34 monitoring.
 - 35 d. Methods for managing livestock and wild horse influences.
- 36 7. Long-term maintenance plans for roads, pipelines, power lines, and facilities:
 - 37 a. Weed control.
 - 38 b. Erosion control.
 - 39 c. Stormwater BMP maintenance.
 - 40 d. Control of unauthorized use or travel.

1 e. Inspection and reporting schedule.

2 **2.3 Additional Instances Requiring Site-Specific Reclamation**
3 **Plan Submission**

- 4 • As an attachment to Sundry Notice and Report on Well (Form 3160-5) if the APD was
5 formerly approved without a reclamation plan.
- 6 • As a separate Sundry Notice submitted at the same time as the Subsequent Report of Well
7 Abandonment (43 CFR 3162.4).
- 8 • Prior to requesting to abandon a right-of-way.
- 9 • Prior to any actions associated with the project that may influence reclamation.

10 The operator/holder can propose to amend the reclamation plan at any time via Sundry Notice.

3.0 Timeframes, Success Criteria, and Requirements

Reclamation success is determined by specific standards (that vary by phase) associated with a self-sustaining Desirable Plant Community (DPC) as defined by the range site or an associated reference site. In Phase I interim reclamation, physical measures may be combined with vegetation-based techniques to successfully stabilize, protect, and preserve soils. Phase II interim reclamation and Final reclamation for oil and gas activities would be considered successful once attaining the criteria described at 3.1.2.3 and 3.2, respectively. It is the responsibility of the operator to make repeated attempts (e.g., seeding, weed control) until successful reclamation has been achieved and accepted by the BLM. A timeline for reclamation activities is provided in Table G-1.

3.1 Interim Reclamation

There are two distinct phases of interim reclamation recognized by the WRFO to manage surface disturbance associated with energy development. Phase I interim reclamation generally begins within 24 hours from the time when surface disturbing activities have ended. Surface disturbing activities include, but are not limited to, road construction and well pad construction. Phase II generally begins when drilling on the pad has ended and the wells are ready for completion and/or production. Rights-of-way (e.g., pipelines and power lines) do not necessarily have an interim reclamation phase, but proceed immediately to Final reclamation upon completion of construction. Pipeline and power line construction should be scheduled so that seed bed preparation and seeding occurs in optimal timeframes for reclamation success.

3.1.1 Phase I Interim Reclamation

Phase I interim reclamation is designed to stabilize and protect soil resources from erosion and to properly store topsoil during periods of active well development such that it remains viable and available for redistribution during later stages of reclamation. Soil stabilization measures should include vegetation-based techniques, but may rely primarily on physical measures such as erosion fabric.

3.1.1.1 Timeframe (Phase I)

Phase I interim reclamation will be implemented immediately (i.e., within 24 hours) after surface disturbing activities have ended. Application of seed should generally be avoided between April and August, but BLM will consider exceptions on a case-by-case basis.

3.1.1.2 Success Criteria (Phase I)

The primary objective of Phase I interim reclamation is to stabilize and protect soil resources from wind and water erosion. BLM acknowledges that Phase I interim reclamation techniques may rely predominantly on physical measures such as erosion fabric. In those circumstances where vegetation establishment is used to stabilize soils, the primary determinant for evaluating reclamation success will be desirable ground cover rather than seeded vegetation composition. At a minimum, the following standards must be met in order for Phase I interim reclamation to be deemed successful:

1. All disturbed areas including stockpiled soils and the surrounding area are kept free of noxious and undesirable invasive weeds, construction debris, and trash.
2. Soil piles and all areas of surface disturbance not required for operations are protected (e.g., mulch, matting, netting, tackifiers, established re-vegetation,).

3. There is no evidence of excessive erosion such as slope or soil instability, subsidence, or slumping at the site or in areas adjacent to the site (as compared to the range site).
4. Stored topsoil to be used in later phase of reclamation is identified (e.g., signs or fencing), protected, and appropriately placed to minimize disturbance in later stages of reclamation.

3.1.1.3 Requirements (Phase I)

The following requirements apply to Phase I interim reclamation and are designed to help meet the success criteria for this phase of reclamation.

1. The project lead (NRS/Realty Specialist) will be notified via email or by phone at least 24 hours prior to beginning any BLM approved construction-related activities, regardless of size, that result in disturbance of surface soils.
2. Prior to beginning reclamation activities, a pre-reclamation onsite meeting must be scheduled with the project lead (NRS/Realty Specialist). Reclamation activities may include, but are not limited to recontouring, seed bed preparation, seeding, or construction of livestock exclosures.
3. All equipment that may act as a vector for weeds will be cleaned before entering the WRFO. Equipment will also be cleaned (e.g., with a portable pressure washer) when leaving and/or moving between work-sites if the pre-disturbance weed inventory indicated the presence of undesirable invasive or noxious weeds and there is a risk of transporting these weed seeds or propagules.
4. Trees or shrubs that must be removed for construction or ROW preparation will be cut down or masticated to a stump height of six inches or less prior to other heavy equipment operation. Trees removed for construction that are not needed for reclamation purposes will be cut in four foot lengths (down to four inches diameter) and placed in manageable stacks immediately adjacent to a public road to facilitate removal by the public. Woody materials required for reclamation will be stockpiled and stored separately from stockpiled topsoil and may be positioned along the margins of the authorized use area. Smaller limbs and trees may be chipped and stockpiled if needed for reclamation, and with approval from the AO, incorporated into the top 6-10 inches of topsoil. Boles, limbs, and other large woody material should be retained for redistribution not to exceed 20-30 percent total ground cover.
5. During site construction all topsoil will be stripped from the location, handled separately from subsoil materials, and stored for reuse during Phase II interim reclamation and/or Final reclamation.
6. Balance cut and fill to the maximum extent possible in order to minimize excess spoils piles and facilitate Phase II interim reclamation.
7. Topsoil must be salvaged during road construction and respread to the greatest degree practical on cut slopes, fill slopes, and borrow ditches prior to seeding. Road shape will be built using the borrow ditch subsoil. Topsoil may be stabilized with mulch as needed.
8. Properly store topsoil to protect it from erosion and compaction, assure that it remains readably identifiable (i.e., signed), viable, and available for redistribution during later stages

- 1 of reclamation. Topsoil piles that will be stored for more than one month will be seeded
2 with an approved BLM seed mix, stabilized with certified weed free erosion fabric or
3 mulch, and may require fencing. When topsoil will be stored for more than one year and
4 other resource values can be accommodated, topsoil will be stored in piles with a depth of
5 two feet or less.
- 6 9. Topsoil will only be used as a seed bed for reclamation. Under no circumstances will
7 topsoil be used as a pipe bedding material, to fill sacks for trench breakers, or for any other
8 use as construction material. Fines and organics will not be shaken out of the effective
9 rooting zone soils for pipeline bedding.
- 10 10. Vegetative and structural soil stabilization practices will be required on cut and fill slopes
11 off the working surfaces and in areas near water features, e.g., streams (including ephemeral
12 drainages, ponds, and wetlands), or in other situations where wind or water erosion may
13 otherwise accelerate movement of sediments.
- 14 11. All disturbed surfaces, including cut and fill slopes and drainage ditches along roads, will
15 be seeded with a BLM approved seed mix. On roads, topsoil will be spread where
16 successful revegetation is likely (e.g., along appropriate cut and fill slopes or at the top edge
17 of the borrow ditches) and where it will not be disturbed during regular road maintenance
18 activities.
- 19 12. Livestock should generally be excluded from reclaimed areas until successful reclamation is
20 achieved. These decisions will be made by the BLM on a case-by-case basis. Fences,
21 cattleguards, and gates (all built to BLM specifications per BLM manual H-1741-1) will be
22 installed, maintained, and removed by the operator upon approval by the AO. In specific
23 and predetermined instances, livestock exclosures may be retained for extended periods to
24 meet other resource objectives.
- 25 13. To track Phase I and Phase II interim and Final reclamation, the operator will submit
26 Geographic Information System (GIS) data to the WRFO project lead (NRS/Realty
27 Specialist) for any post construction (i.e., "as-built") polygon feature that is associated with
28 the project. GIS data will be submitted within 30 days from when construction has
29 completed for all geographic features associated with the project. The operator will submit
30 updated GIS data to the WRFO for any location or orientation changes within 14 calendar
31 days of the change. GIS data will include constructed access roads, existing roads that were
32 upgraded, pipeline corridors, temporary work areas, well pad footprints, and ancillary
33 facilities. Geospatial (GIS/GPS/RS) data submitted to WRFO shall be in a format
34 compatible with the WRFO's Geospatial Data Submission Standards. This information can
35 be found on the WRFO website or in the glossary.
- 36 14. The operator will be required to meet with the WRFO reclamation staff in March or April
37 of each calendar year and present a comprehensive work plan. The purpose of the plan is to
38 provide information pertaining to reclamation activities that are expected to occur during
39 the coming year. Operators will also provide a map that shows all sites where some form of
40 reclamation activity is expected to occur during the coming year.
- 41 15. A Reclamation Status Report (see Section 4) including weed survey results for each site
42 will be submitted electronically to the WRFO annually (due January 1st) until it is

determined that reclamation of the site has met all required objectives of Phase I interim reclamation.

3.1.2 Phase II Interim Reclamation

Phase II interim reclamation will involve recontouring the site to maximize the extent of disturbance available for reclamation, leaving the minimum area necessary for routine production and maintenance activities or as necessary to accommodate BLM authorized development plans. Desired native or seeded vegetation will be established and self-sustaining on as much of the disturbance as practicable to minimize soil erosion, inhibit noxious and undesirable invasive weed establishment, minimize visual resource impacts, allow for the advance of successional processes, and provide specific wildlife habitat components over the productive life of the well pad or facility.

The WRFO uses early-seral successional stages of the NRCS Ecological Site Descriptions (ESDs) to compare to reclamation cover and composition values to determine if reclamation success has been achieved for Phase II and Final reclamation. Because many ESDs are not yet available, the WRFO has developed an eco-site database using the Assessment, Inventory, and Monitoring (AIM) protocol (BLM TN 440) to provide cover and composition data that will be used as DPC reference data until ESDs are developed. The AIM protocol gathers much of the same data used to characterize sites when developing ESDs. Success criteria for potential foliar and/or basal cover will be determined on a site by site basis according to the AIM data.

3.1.2.1 Timeframe (Phase II)

Revised Onshore Order Number 1 requires that earthwork for interim reclamation is to be completed within six months of the conclusion of drilling. WRFO prefers to have recontouring work either deferred or expedited so that seed can be applied to a fresh seedbed during the optimal seeding times (i.e., September through March), or as otherwise approved by the BLM. Topsoil redistribution and seedbed preparation should be accomplished immediately before seeding.

Phase II interim reclamation will be initiated when one of the following applies:

- The last well on a pad has been drilled and has undergone completion.
- There are no drilling activities expected on the pad for the next six months.
- There has been no activity on the pad within the last six months, regardless of whether or not there are outstanding approved APDs.

Deadlines for reclamation are subject to extension upon the approval of the AO based on weather, timing limitations, or other constraints on a case-by-case basis.

3.1.2.2 Success Criteria (Phase II)

Successful reclamation must conserve the potential of the site to produce vegetation on a sustainable basis and must meet the Colorado Standards for Public Land Health. At a minimum, with BLM consideration to site conditions (i.e., elevation, slope, aspect), the following standards must be met in order for Phase II interim reclamation to be deemed successful:

1. All disturbed areas including stockpiled soils are kept free of noxious and undesirable invasive weeds, construction debris, and trash.

2. There is no evidence of excessive erosion such as slope or soil instability, subsidence, or slumping at the site or in areas adjacent to the site (as compared to the range site description).
3. Self-sustaining desirable vegetative groundcover consistent with the site DPC (as defined by the range site, WRFO AIM protocol site data (BLM TN 440), or an associated approved reference site) is adequately established as described below on disturbed surfaces to stabilize soils through the life of the project. As ESDs are developed those cover values may replace range site, AIM data, or reference site values.
 - a. Vegetation with eighty percent similarity of desired foliar cover, bare ground, and shrub and/or forb density in relation to the identified DPC. In the absence of specified DPC data, an agreed upon reference site or AIM data would serve as the DPC. Vegetative cover values for woodland or shrubland sites are based on the capability of those sites in an herbaceous state.
 - b. The resulting plant community must have composition of at least five desirable plant species, and no one species may exceed 70 percent relative cover to ensure that site species diversity is achieved. Desirable species include native species from the surrounding site, species listed in the range/ecological site description, or species from the BLM approved seed mix.
 - c. If non-prescribed or unauthorized plant species (e.g. yellow sweetclover, *Melilotus officinalis*) appear in the reclamation site BLM may require their removal.
4. Adequate desirable vegetative groundcover is established on disturbed surfaces to stabilize soils through the operational life of the project.
 - a. The vegetation community established on the reclaimed site is capable of persisting without continued intervention (excluding routine weed management) and will allow plant community successional processes to progress toward advanced community states.
 - b. Bare ground does not exceed the range site description or if not described, bare ground will not exceed that of a representative undisturbed DPC meeting the Colorado Standards for Public Land Health.
5. Reclamation success in areas affected by cheatgrass and/or other invasive annual species will be qualified based on the condition of the project site (i.e., the relative vegetative cover) prior to disturbance.
 - a. If the project site contains less than 25 percent relative cover of undesirable species, interim reclamation will be considered acceptable when the relative cover of undesirable species on the project site does not exceed 5 percent.
 - b. If the project site contains 25 percent to 50 percent relative cover of undesirable species, interim reclamation will be considered acceptable when the relative cover of undesirable species on the project site does not exceed 10 percent.
 - c. If the project site contains more than 50 percent relative cover of undesirable species, interim reclamation will be considered acceptable when the relative cover of undesirable species on the project site does not exceed the level defined by site-specific criteria established in the reclamation plan developed for that site.

3.1.2.3 Requirements (Phase II)

In addition to the procedures listed above for Phase I interim reclamation, the following requirements apply to Phase II interim reclamation.

1. Recontour to maximize the extent of disturbance available for reclamation and restore all natural drainages to the extent possible. Soils must be returned to their respective positions in the predisturbance soil profile. Recontoured surfaces must be stable and have adequate surface roughness to reduce surface run-off.
 - a. For well pads, place rock into cut first where it can be buried below the surface. The surface cover and size distribution of exposed rock must not exceed pre-disturbance site conditions documented in the project specific reclamation plan (except when rock is used as an approved erosion control feature).
 - b. After placement of subsoil, decompaction (ripping) or other preparation of subsoils must occur prior to spreading topsoil over the ground surface. Generally, all topsoil should be redistributed across all surfaces subject to Phase II interim reclamation. Topsoil will not be spread when the ground or topsoil is frozen or too wet to adequately support construction equipment. Soil is deemed “too wet” if equipment creates ruts greater than three inches.
 - c. All topsoil that has been stockpiled for an extended period of time (six months or greater) should be retested using the same procedure described in Section 2.1 Item 1d to determine topsoil viability before it is re-spread. Analytical results should be compared to data obtained for soil characteristics prior to disturbance. If the comparison indicates problems with soil productivity, topsoil may be treated with amendments approved by the AO to meet the physical, chemical, and biological properties necessary for successful reclamation.
2. After topsoil has been redistributed, all disturbed areas will be seeded using a BLM approved seed mix. Seeding should occur between the beginning of September and the end of March (depending on elevation) or as otherwise approved by BLM (See Table G-5).
3. Once the disturbance has been recontoured and the seedbed has been prepared and seeded, stockpiled woody material be scattered across the reclaimed area where the material originated. Chipped material should be scattered across reclaimed areas in a manner that avoids the development of a mulch layer that suppresses growth or reproduction of desirable vegetation. With approval from the AO, chipped woody material could be incorporated into the top 6-10 inches of topsoil. Redistribution of large woody debris will not exceed 20-30 percent ground cover and excess material must be removed from the site. Large woody material should be distributed in a manner that helps deter vehicle use and promote a heterogeneous landscape. Materials would be distributed in such a way to avoid concentrations of heavy fuels that constitute a fire hazard or suppress adequate vegetation growth.
4. Disturbed and reclaimed areas will be managed to control dust and must be kept free of State of Colorado A and B listed noxious weeds.
5. Ensure that weed treatments are conducted in an effective manner compatible with approved seed mixes. To reduce the need for repeated bare ground herbicide treatments around facilities, alternative methods such as gravel, weed barrier fabric, or low-growing,

- disturbance-tolerant herbaceous vegetation may be used as authorized for a specific site by the BLM.
6. Cover, composition, and diversity data should be gathered using quantitative methods to measure the six Core Terrestrial Indicators and Methods in BLM Technical Note 440. Approved methods are found in Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I and II: Quick Start. In order to consistently measure success, forb and shrub density must be measured along the same transects as cover and composition using a 2 meter wide belt transect (Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems – Volume 1: Quick Start). BLM can provide direction and data collection sheets. Other data gathering methods must provide statistically rigorous quantitative monitoring data that conforms to BLM’s Assessment Inventory and Monitoring (AIM) strategy. Other data collection methods can be found in BLM Technical Reference 1730-1 may be used if pre-approved by the BLM.
 7. To track interim reclamation, the operator will submit Geographic Information System (GIS) data via the current data management system for all seed application areas. GIS data will be submitted within 14 calendar days from the time when seed has been applied.
 8. A Reclamation Status Report, including weed survey results for each reclamation site will be submitted electronically to the WRFO annually and a vegetation monitoring report every third year (both due January 1st) until reclamation at that site is deemed successful (see Chapter 4).

3.2 Final Reclamation

Final reclamation will be applied once pipelines and power lines are installed, wells are plugged and abandoned, or after the operational life of the facilities has ended. Desired vegetation will be established on the entire reclaimed disturbance to minimize soil erosion, inhibit noxious and undesirable invasive weed establishment, allow for the advance of successional processes, and provide specified wildlife and/or special status plant habitat components. Operators may be required to update their reclamation plan to incorporate current reclamation practices at the time of abandonment or reauthorization.

3.2.1 Timeframe (Final)

Final reclamation on pipelines will be initiated immediately after installation and seeding should occur during recommended periods. Revised Onshore Order Number 1 requires that earthwork for Final reclamation is completed within six months of well plugging. WRFO prefers to have final recontouring work either deferred or expedited so that seed can be applied to a fresh seedbed during the optimal seeding times (i.e., September through March), or as otherwise approved by the BLM. Topsoil redistribution and seedbed preparation should be accomplished immediately before seeding.

Final reclamation will be initiated when one of the following conditions exist:

- The operator encounters a “dry hole” and no further exploration or production is planned at the location.
- The final well on a pad has been plugged and abandoned.
- Facilities or infrastructure are no longer used in operations.

- The facilities that an access road serves have ceased operations and the road will be obliterated.

3.2.2 Success Criteria (Final)

At a minimum, the following standards must be met in order for Final reclamation to be deemed successful:

1. All reclaimed areas are kept free of noxious and undesirable invasive weeds, construction debris and trash.
2. There is no evidence of excessive erosion such as slope or soil instability, subsidence, or slumping at the site or in areas adjacent to the site (as compared to the range site description).
3. Stormwater management structures and drainage features (e.g., culverts and ditches) installed by the operator have been removed and reclaimed except where specified/approved by BLM to be left in place.
4. The site has been recontoured to its pre-disturbance contour or a contour that blends with the surrounding landform.
5. The surface cover and size distribution of exposed rock must not exceed pre-disturbance site conditions documented in the project specific reclamation plan (except when rock is used as an approved erosion control feature).
6. Roads built for and no longer supporting oil and gas development have been recontoured, obliterated, revegetated, and are no longer distinguishable as a means of vehicle travel (i.e., no ruts or two-tracks).
7. All signs, fences, gates, and cattleguards associated with livestock enclosures have been removed from the site, unless in specific predetermined instances the AO directs that livestock enclosures be retained for extended periods to meet other resource objectives.
8. Self-sustaining desirable vegetative groundcover consistent with the site DPC (as defined by the range site, WRFO AIM protocol site data (BLM TN 440), or an associated approved reference site) is adequately established as described below on disturbed surfaces to stabilize soils through the life of the project. As ESDs are developed those cover values may replace range site, AIM data, or reference site values.
9. Final reclamation is considered successful when the entire reclamation site (including obliterated roads) has attained the following criteria:
 - a. Vegetation with eighty percent similarity of desired foliar cover, bare ground, and shrub and/or forb density in relation to the identified DPC. In the absence of specified DPC data, an agreed upon reference site or AIM data would serve as the DPC. Vegetative cover values for woodland or shrubland sites are based on the capability of those sites in an herbaceous state.
 - b. The resulting plant community must have composition of at least five desirable plant species, and no one species may exceed 70 percent relative cover to ensure that site species diversity is achieved. Desirable species include native species from the

surrounding site, species listed in the range/ecological site description, or species from the BLM approved seed mix.

- c. If non-prescribed or unauthorized plant species (e.g. Yellow sweetclover, *Melilotus officinalis*) appear in the reclamation site BLM may require their removal.

- 10. The vegetation community established on the reclaimed site stabilizes soils, is capable of persisting without continued intervention (excluding routine weed management), and will allow plant community successional processes to progress toward advanced community states.

- 11. Bare ground does not exceed that of the range site or if not described, bare ground does not exceed that of a representative undisturbed DPC meeting the Colorado Standards for Public Land Health.

- 12. Reclamation success in areas affected by cheatgrass and/or other invasive annuals will be qualified based on the condition of the project site (i.e., the relative vegetative cover) prior to disturbance.

- a. If the project site contains less than 25 percent relative cover of undesirable species, Final reclamation will be considered acceptable when the relative cover of undesirable species on the project site does not exceed 5 percent.
- b. If the project site contains 25 percent to 50 percent relative cover of undesirable species, Final reclamation will be considered acceptable when the relative cover of undesirable species on the project site does not exceed 10 percent.
- c. If the project site contains more than 50 percent relative cover of undesirable species, Final reclamation will be considered acceptable when the relative cover of undesirable species on the project site does not exceed the level defined by site-specific criteria established in the reclamation plan developed for that site.

3.2.3 Reclamation Requirements (Final)

In addition to all applicable Phase I and Phase II interim reclamation requirements listed above, the following additional requirements apply to Final reclamation.

- 1. Sampling of soils directly beneath facilities may be required, depending on the type of facility, to assure compliance with State of Colorado Total Petroleum Hydrocarbons (TPH) and Salinity quality standards prior to being incorporated into the reclaimed surface. If sampled, laboratory analytical results, resulting actions taken by the operator, and GPS coordinates of tested locations must be submitted via Sundry Notice to the AO prior to submitting a Request for Final Abandonment.
- 2. Roads that existed prior to development have been returned to their original state unless otherwise directed by the AO. Roads left at the end of Final reclamation should be designed at an appropriate standard, no higher than necessary to accommodate their intended function.
- 3. Unless authorized, there will be no vehicle access, including OHVs, on linear rights-of-way (e.g., pipelines and power lines). Physical barriers (e.g., fences, rocks, etc.) may be necessary to prevent travel on reclaimed surfaces. Woody materials would be distributed in such a way to avoid large concentrations of heavy fuels.

4. Where needed, signs and/or deterrents to limit public use of reclaimed surfaces should be installed. These items and livestock control measures must also be removed upon approval of Final Abandonment by the WRFO BLM.
5. Cover, composition, and diversity data should be gathered using quantitative methods to measure the six Core Terrestrial Indicators and Methods in BLM Technical Note 440. Approved methods are found in Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I and II: Quick Start. In order to consistently measure success, forb and shrub density must be measured along the same transects as cover and composition using a 2 meter wide belt transect (Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems – Volume 1: Quick Start). BLM can provide direction and data collection sheets. Other data gathering methods must provide statistically rigorous quantitative monitoring data that conforms to the BLM's Assessment Inventory and Monitoring (AIM) strategy. Other data collection methods can be found in BLM Technical Reference 1730-1 may be used if pre-approved by the BLM. Monitoring of pipeline reclamation will occur at appropriate intervals (approved by BLM) to determine if success criteria have been met and identify problem sites that require follow-up actions.
6. The BLM WRFO AO will be informed when Final reclamation has been successfully completed (based on results of vegetation monitoring data) and the site is ready for final inspection.

Table G-1. Timeline for Reclamation Activities

Phase	Actions
Predisturbance	1) A Reclamation Plan is submitted as part of the Surface Use Plan (SUP) with an Application for Permit to Drill (APD), Form 3160-3, or as part of a Right-of-Way Application, or when there is a change in action (see Section 2). <i>Prior to beginning construction; monitoring methods, site specific surveys, and pre-disturbance evaluations are completed as described in site specific reclamation plan.</i>
	2) BLM reviews or prepares an environmental assessment to analyze potential impacts of the proposed action. Identified impacts are mitigated with BLM Conditions of Approval (COAs). The approved Reclamation Plan and applied COAs specify procedures and techniques to be used at each stage of reclamation.
Phase I Interim Reclamation	3) Phase I interim reclamation is implemented immediately (within 24 hours) after surface disturbing activities (e.g., construction of access road and pad) have ended. The goal of Phase I interim reclamation is to stabilize, protect and preserve soils during construction and drilling (see Section 3.1.1.1). Rights-of-way (e.g., pipelines, power lines) proceed immediately to Final reclamation of the surface (see Section 3.2.1).
	4) Phase I interim reclamation (see Section 3.1.1.3) typically involves the following activities: <ul style="list-style-type: none"> • Install approved BMPs and stabilization measures for slopes and stockpiled soils • Begin/continue weed control measures
Phase II Interim Reclamation	5) Earthwork for Phase II recontouring must begin within six months (weather permitting) of drill rig leaving the location, (see Section 3.1.2.1). The goal of Phase II interim reclamation is to recontour and reclaim the maximum extent of the disturbance as possible while leaving the minimum area necessary for routine production and maintenance activities. Phase II interim reclamation helps to establish desirable vegetation to minimize soil erosion, inhibit weed establishment, allow for the advancement of successional processes, and provide specific wildlife habitat components over the productive life of the well pad or facility (see Section 3.1.2).
	6) Maintenance activities such as weed control and stormwater control described in the approved Reclamation Plan continues throughout Phase II (see Section 3.1.2.3).
	7) The completion of earthwork for Phase II should coincide with optimal seeding times (i.e. September through March), or as otherwise approved by the BLM. After recontouring is complete, stored topsoil is re-spread, and if approved, soil amendments are added. Following topsoil placement, seed is applied, stabilization measures are installed, and woody debris is spread on reclaimed areas. Following seeding, fencing (if not already in place) is installed. Phase II interim reclamation remains in place through the life of the well or facility (see Section 3.1.2.3).
Final Reclamation	8) Earthwork for Final reclamation must be completed within six months of well plugging (see Section 3.2.1). The goal of Final reclamation is to return the site to as close as possible to its original contour and its predisturbed condition with desirable, self-sustaining vegetation to minimize soil erosion, inhibit weed establishment, allow for the advancement of successional processes, and provide specific wildlife habitat components (see Section 3.2).
	9) Disturbed areas (e.g., pads, roads, linear facilities, facility sites) must be reclaimed to a satisfactorily revegetated, safe, and stable condition. Earthwork and soil preparation should be timed to be completed immediately prior to optimal seeding times (i.e., September through March), or as otherwise approved by the BLM (see Section 3.2.1).
	10) When Final reclamation efforts are successful the operator submits a Final Abandonment Notice (FAN) to the BLM. Final abandonment will not be approved until the surface reclamation work has been completed and seeded vegetation has established to the satisfaction of the BLM (see Section 3.2.2).

4.0 Reclamation Status Reports

Reclamation status reports will be submitted annually in order to monitor progress at all reclaimed sites across the WRFO. Reclamation vegetation monitoring, completed by qualified personnel, should occur within the growing season and begin the second year after reclamation efforts are initiated and every third year after that until final abandonment. The BLM may require more frequent monitoring of reclamation if necessary. Vegetation monitoring reports should be submitted to the BLM with the reclamation status report via the current data management system. Vegetation monitoring must also be completed and reported in conjunction with the final abandonment notice. An internal and external review of the WRFO reclamation status report and the processes used to acquire necessary information will be conducted and incorporated periodically.

4.1 Timeframe for Reclamation Status Report Submission

A reclamation status report for each site will be submitted electronically to the WRFO annually (due January 1st) until it is determined that reclamation of the site has met all required objectives of that particular reclamation phase. Every third year, a vegetation monitoring report should accompany the status report.

The reclamation status report will be submitted electronically via the most current data management system. Contact your WRFO project lead (NRS/Realty Specialist) with any questions. Any changes to the project status or related information can also be provided through the most current data management system.

4.2 Status Report Components

The reclamation status report will include (at a minimum) the following components to sufficiently and accurately characterize progress and status of reclamation to be included in a BLM database:

- The original National Environmental Policy Act (NEPA) document number and, if applicable, realty case file number or the well number and American Petroleum Institute (API) number.
- “As-built” GIS data of the project feature(s) (e.g., well pad, pipeline, travel or power-line corridor, ancillary facilities, etc.).
- The date of the inspection.
- Legal description and UTM coordinates for each discrete point feature associated with the report.
- A reclamation diagram will be included in the report and submitted for each project feature. The reclamation diagram will clearly show the area(s) where reclamation activities have occurred and will also include each point, polygon, or polyline feature that is associated with the report.
- Range site.
- Reclamation status (e.g., “Phase I interim,” “Phase II interim,” or “Final”).
- Re-contouring status, including areas returned to final contours.
- Date(s) seeded, an estimate of the total area seeded (in acres), seed mixture applied, and seeding method (e.g., broadcast, drilled, hydro-mulched, etc.), if applicable.

- Contact information for the person responsible for developing the report.
- Additional notes pertaining to the overall condition of the site including identification of sites in need of additional reclamation actions with an outline of the actions to be taken.
- Weed management plans, surveys, and treatment actions including Pesticide Application Reports (PAR).
- Permanent photo points identified and noted on the reclamation diagram. Photos will be taken at each photo point, and the date the photo was taken will be noted on each photo. (Refer to BLM Technical Reference 1730-1 for specific guidance regarding establishing photo points.)

Reclamation vegetation monitoring reports should accompany the (above) status report to include in the BLM database. It must include (at a minimum) the following components to sufficiently and accurately characterize progress of the vegetative community establishment:

- Vegetative attributes for seeded surfaces. (Refer to BLM Core Terrestrial Indicators and Methods (Technical Note 440), preferably, or Technical Reference 1730-1 for guidance regarding quantitatively assessing vegetative species composition and cover.) The size of each reclaimed area must be specified as well as the number of transects and points hit along the intercept. Indicators to measure and quantify:
 - Bare ground including rock fragment, woody debris, biotic soils (if applicable), and litter estimates
 - Plant cover
 - Vegetation composition
 - Relative cover of all plant species found in the line-point intercept monitoring
 - Plant species of management concern
 - Species richness over entire reclaimed area
 - Nonnative invasive plant species
 - Vegetation height
 - Proportion of soil surface in large intercanopy gaps

If any portion of the report is not complete or accurate the operator may be required to re-sample and re-submit it.

5.0 Seed Mixes

BLM approved seed mixes are designed to promote long term establishment of native species, minimize erosion, compete with noxious and undesirable invasive weeds, and provide the foundation for further successional development of vegetation (particularly shrubs and trees) derived from adjacent native communities as habitat for wildlife. Seed mixes are developed according to plant community types and wildlife needs.

If the use of non-native species is desired, justification and documentation of the need is required for BLM to consider its approved use. Examples of this situation could be sites with soils that demonstrate repeated resistance to seedling establishment despite amendment or areas at high risk of reclamation failure due to noxious or invasive weeds. Seed mixes including annual cereal grasses or sterile hybrid crops will generally not be approved for use in the WRFO resource area. BLM may consider exceptions to this policy if research or well-founded empirical information indicates that benefits of a nurse crop outweigh competitive interactions on desired perennial vegetation. All seed placed on BLM and split-estate lands will comply with United States Department of Agriculture (USDA) state noxious weed seed requirements. Any seed lot with test results showing presence of State of Colorado A or B list species will be rejected in its entirety and a new tested lot will be used for reclamation.

5.1 Seed Mix Selection, Application Methods, and Rates

Most range sites within the WRFO have been assigned a seed mix (Table G-2). These seed mixes have been designed by considering soil types, ranges sites, and the composition of native species likely to occur in the potential native plant community. Some of the range sites or soil units within the WRFO have not been assigned a seed mix. For sites with specialized characteristics (e.g., riparian floodplains, shale barrens, community variations within the ecological site) or those difficult to reclaim (e.g., rocky, shallow soils or steep slopes) specific seed mixes will be approved by the BLM on a case-by-case basis.

Drill seeding is the preferred method of seed application, however special circumstances may warrant another seeding method. If slopes are too steep or otherwise unsuitable for drilling, seed will be broadcast at double the rate specified. Broadcast seed should be covered by harrowing or raking to ensure germination and establishment. Hydromulching after seed application will generally be recommended on steeper slopes.

Where appropriate, the AO may require (or consider proposals to employ) seeding and seedbed preparation techniques that favor germination and seedling establishment of forb and shrub seeds in conjunction with, or as a supplement to, conventional drill-seeding applications. These techniques are intended to avoid problems associated with applying or mixing seeds that differ from grass seed in size or density.

Seed mixes in Table G-3 were designed to average 50 seeds per square foot with the assumption that there would not be a substantial viable seed bank remaining in topsoil piles that had been stored for greater than six months. At the discretion of the BLM, it may be appropriate to reduce the seeding rates (i.e., adjusted to 20-30 seeds per square foot) in circumstances where a substantial viable seed bank persists in the topsoil (e.g., pipelines in which the topsoil is removed and replaced in the same growing season).

The composition of Phase I interim reclamation seed mixes may be different from those used during Phase II interim reclamation and Final reclamation since the BLM would not generally require the use of forb or shrub seed during Phase I interim reclamation. If non-prescribed or unauthorized plants appear in the reclamation site, BLM may require their removal.

Table G-2. Seed Mixes Tied to Range Sites within the WRFO

Seed Mix	Range Sites
1	Alkali Flat, Alkaline Slopes, Clayey Foothills, Clayey Slopes
2	Deep Loam, Loamy Slopes, Loamy, Loamy 10-14 in PPT, Loamy Bottom, Loamy Breaks, Loamy Slopes, Rolling Loam
3	Desert Clay, Foothills Juniper, Mountain Pinyon, Pinyon Juniper Woodlands, Sandy Juniper, Stoney Foothills, Soil Unit 206mcs
4	Sandhills, Sandy Foothills
5 or 10 ⁽¹⁾	Foothill Swale, Swale Meadow
6	Aspen, Brushy Loam, Deep Clay Loam, Douglas-Fir Woodland, Lodgepole Pine Woodland, Mountain Loam, Mountain Meadow, Mountain Shallow Loam, Mountain Swale, Spruce-Fir Woodland
7	Dry Exposure, Dry Mountain Loam, Stoney Loam
8 or 9 ⁽¹⁾	Clayey Loam, Clayey Saltdesert, Desert Shallow Clay, Loamy Cold Desert, Loamy Saltdesert, Salt Meadow, Saltdesert Breaks, Saltdesert Overflow, Sandy, Sandy Saltdesert, Semidesert Clay Loam, Semidesert Gravelly Loam, Semidesert Loam, Semidesert Sandy Loam, Semidesert Shallow Loam, Silty Saltdesert, Upland Shallow Loam, Upland Stony Loam, and Soil Units 196mcs and 204mcs

NOTE:

⁽¹⁾Two seed mixes are presented as options available only at the discretion of the BLM in areas that are known to be especially harsh sites to reclaim. The second seed mix listed is a mix of native and introduced species.

Table G-3. Standard Seed Mixes
(50 seeds per square foot application rate)

Seed Mix	Cultivar	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
1	Rosana	Western Wheatgrass	<i>Pascopyrum smithii</i>	4.5
	Critana	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	3.5
	Toe Jam Creek	Bottlebrush Squirrealtail	<i>Elymus elymoides</i>	3
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5
		Sulphur Flower Buckwheat	<i>Eriogonum umbellatum</i>	1.5
		Winterfat	<i>Krascheninnikovia lanata</i>	1
	Alternates:⁽¹⁾			
	Sodar	Streambank Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>psammophilus</i>	3.5
		Annual Sunflower	<i>Helianthus annuus</i>	3
		Mat Saltbush	<i>Atriplex corrugata</i>	2
2	Arriba	Western Wheatgrass	<i>Pascopyrum smithii</i>	4
	Rimrock	Indian Ricegrass	<i>Achnatherum hymenoides</i>	3.5
	Whitmar	Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	4
	Lodorm	Green Needlegrass	<i>Nassella viridula</i>	2.5
	Timp	Northern Sweetvetch	<i>Hedysarum boreale</i>	3
		Sulphur Flower Buckwheat	<i>Eriogonum umbellatum</i>	1.5
	Alternates:⁽¹⁾			
		Needle and Thread	<i>Hesperostipa comata</i> ssp. <i>comata</i>	3
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5
3	Rosana	Western Wheatgrass	<i>Pascopyrum smithii</i>	4
	Whitmar	Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	3.5
	Rimrock	Indian Ricegrass	<i>Achnatherum hymenoides</i>	3
		Needle and Thread Grass	<i>Hesperostipa comata</i> ssp. <i>comata</i>	2.5
	Maple Grove	Lewis Flax	<i>Linum lewisii</i>	1
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5
	Alternates:⁽¹⁾			
	Critana	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	3
		Sulphur Flower Buckwheat	<i>Eriogonum umbellatum</i>	1.5

**Table G-3 continued. Standard Seed Mixes
(50 seeds per square foot application rate)**

Seed Mix	Cultivar	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
4	Rosana	Western Wheatgrass	<i>Pascopyrum smithii</i>	3.5
	Critana	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	2.5
	Rimrock	Indian Ricegrass	<i>Achnatherum hymenoides</i>	3
		Needle and Thread Grass	<i>Hesperostipa comata</i> ssp. <i>comata</i>	2.5
		Northern Sweetvetch	<i>Hedysarum boreale</i>	3
		Sulphur Flower Buckwheat	<i>Eriogonum umbellatum</i>	1
	Alternates:⁽¹⁾			
	Toe Jam Creek	Bottlebrush Squirrealtail	<i>Elymus elymoides</i>	2
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5
5	Magnar	Basin Wildrye	<i>Leymus cinereus</i>	3.5
	Rosana	Western Wheatgrass	<i>Pascopyrum smithii</i>	3.5
	San Luis	Slender Wheatgrass	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	3
	Critana	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	3
	Timp	Northern Sweetvetch	<i>Hedysarum boreale</i>	4.5
	Maple Grove	Lewis Flax	<i>Linum lewisii</i>	1
	Alternates:⁽¹⁾			
	Sodar	Streambank Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>psammophilus</i>	3
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5
6	UP Plateau	Sandberg bluegrass	<i>Poa secunda</i> ssp. <i>sandbergii</i>	0.5
	San Luis	Slender Wheatgrass	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	2
	Sherman	Big Bluegrass	<i>Poa secunda</i> ssp. <i>ampla</i>	1
	Bromar	Mountain Brome	<i>Bromus marginatus</i>	2
	Maple Grove	Lewis Flax	<i>Linum lewisii</i>	1
	Bandera	Rocky Mountain Penstemon	<i>Penstemon strictus</i>	0.5
	Alternates:⁽¹⁾			
	Canbar	Canby Bluegrass	<i>Poa secunda</i> ssp. <i>canbyi</i>	0.5
		Arrowleaf Balsamroot	<i>Balsamorhiza sagittata</i>	3

**Table G-3 continued. Standard Seed Mixes
(50 seeds per square foot application rate)**

Seed Mix	Cultivar	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
7		Letterman needlegrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	3
	San Luis	Slender Wheatgrass	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	2
	Whitmar	Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	4
	Sodar	Streambank Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>psammophilus</i>	3
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5
		Sulfur Flower Buckwheat	<i>Eriogonum umbellatum</i>	1
	Alternates:⁽¹⁾			
	UP Plateau	Sandberg Bluegrass	<i>Poa secunda</i> ssp. <i>sandbergii</i>	0.5
		Northern Sweetvetch	<i>Hedysarum boreale</i>	3
8	Viva Florets	Galleta Grass	<i>Pleuraphis jamesii</i>	3
	Rimrock	Indian Ricegrass	<i>Achnatherum hymenoides</i>	3
	Toe Jam Creek	Bottlebrush Squirreltail	<i>Elymus elymoides</i>	2.5
	Rosana	Western Wheatgrass	<i>Pascopyrum smithii</i>	4
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.25
		Annual Sunflower	<i>Helianthus annuus</i>	2.5
		Mat Saltbush	<i>Atriplex corrugata</i>	2
	Alternates:⁽¹⁾			
	UP Plateau	Sandberg Bluegrass	<i>Poa secunda</i> ssp. <i>sandbergii</i>	0.5
		Fernleaf Biscuitroot	<i>Lomatium dissectum</i>	3
		Shadscale	<i>Atriplex confertifolia</i>	2
Seed Mix 9 and 10 may only be used after BLM interdisciplinary team analysis and approval				
9	Rosana	Western Wheatgrass	<i>Pascopyrum smithii</i>	5
	Bozoisky-Select	Russian Wildrye	<i>Psathyrostachys juncea</i>	3
	Hycrest	Crested Wheatgrass	<i>Agropyron cristatum</i>	3
		Annual Sunflower	<i>Helianthus annuus</i>	5
	Alternates:⁽¹⁾			
	P27	Siberian Wheatgrass	<i>Agropyron fragile</i>	3.5
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	1

**Table G-3 continued. Standard Seed Mixes
(50 seeds per square foot application rate)**

Seed Mix	Variety	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
10	Magnar	Basin Wildrye	<i>Leymus cinereus</i>	3.5
	Rosanna	Western Wheatgrass	<i>Pascopyrum smithii</i>	4
	Luna	Pubescent Wheatgrass	<i>Elytrigia intermedia</i>	4
	Paiute	Orchardgrass	<i>Dactylis glomerata</i>	1
	Ladak	Alfalfa	<i>Medicago sativa</i>	1.5
	Wytana	Fourwing Saltbush	<i>Atriplex canescens</i>	2
	Alternates:⁽¹⁾			
	Hycrest	Crested Wheatgrass	<i>Agropyron cristatum</i>	1.5
		Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	0.5

NOTE:

⁽¹⁾ As seeds for other native species become commercially available the BLM will consider the use of site adapted (i.e., varieties compatible with local conditions) native species that are listed as a component of the potential native plant community.

The table below is a list of some BLM approved alternate forb species acceptable for use in the seed mixes above. For site specific recommendations or application rates, contact the project lead (NRS or Realty Specialist).

Table G-4. Alternate Forb Species

Variety	Common Name	Scientific Name
	American Vetch	<i>Vivia americana</i>
	Arrowleaf Balsamroot	<i>Balsamorhiza sagittata</i>
	Fernleaf Biscuitroot	<i>Lomatium dissectum</i>
	Hoary Tansyaster	<i>Machaeranthera canescens</i>
	Hood's Phlox	<i>Phlox hoodii</i>
	Mule's Ears	<i>Wyethia amplexicaulis</i>
	Munro Globemallow	<i>Sphaeralcea munroana</i>
	Narrowleaf Indian Paintbrush	<i>Castilleja linariaefolia</i>
	Rayless tansyaster	<i>Machaeranthera grindelioides</i>
	Rocky Mountain Beeplant	<i>Cleome serrulata</i>
	Scarlet Gilia	<i>Ipomopsis aggregata</i>
	Showy Goldeneye	<i>Helimeris multiflora</i>
	Silverleaf Lupine	<i>Lupinus argenteus</i>
	Western Yarrow	<i>Achillea millefolium</i>
Occidentalis	White Evening Primrose	<i>Oenothera pallida</i>
	Wyeth Buckwheat	<i>Eriogonum heracleoides</i>

5.2 Acceptable Seeding Dates

Seeding should occur between September 1 and March 31, depending on elevation and vegetation community, or as otherwise approved by the BLM. General guidelines for dominant vegetation communities within the White River Field Office resource area are provided in the table below.

Table G-5. Acceptable Seeding Dates Based on Vegetation Community

Vegetation Community	Seeding Dates
Desert Shrub	September 1 - February 29
Low Elevation Sagebrush (below 5,500 ft.)	September 1 - February 29
Mid-elevation Sagebrush (5,500 - 7,200 ft.)	September 1 - March 15
High Elevation Sagebrush (above 7,200 ft.)	September 1 - March 31
Low Elevation Pinyon-Juniper (below 5,500 ft.)	September 1 - February 29
Mid-elevation Pinyon-Juniper (5,500 - 7,200 ft.)	September 1 - March 15
High Elevation Pinyon-Juniper (above 7,200 ft.)	September 1 - March 31
Mixed Mountain Shrub	September 1 - March 31
Aspen Forest	September 1 - March 31
Douglas-Fir Forest	September 1 - March 31

6.0 Modifications of Standard Reclamation Success Criteria and Seed Mixes

BLM may request special reclamation procedures or seed mixes to be augmented with special components to meet specific and pre-defined resource objectives.

6.1 Greater Sage-Grouse Habitat

Within the overall range of greater sage-grouse, the following conditions may be imposed:

- Reclamation success criteria on sage-grouse habitats would generally be contingent, where prescribed, on evidence of successful establishment of desired forbs and sagebrush. Reclaimed acreage would be expected to progress without further intervention to a state that meets sage-grouse cover and forage needs based on site capability and seasonal habitat use as per Appendix A, “Structural Habitat Guidelines” from the *Colorado Greater Sage-grouse Conservation Plan*.
- Consistent with existing land use decisions, adapted forms of forbs with recognized utility as sage-grouse forage or cover would be included in Phase II interim and Final reclamation seed mixes applied to surface disturbances in suitable sage-grouse nesting, early brood rearing, and late brood habitats. Native forms would be used as a general rule, but where unavailable or considered beneficial and consistent with existing land use decisions, non-native species with established value to sage-grouse that have no demonstrated tendency to persist more than ten years or disperse beyond the treatment area could be used where approved by BLM.
- When prescribed as a reclamation seed component, local accessions of sagebrush (i.e., material collected on site or seed propagated from “local” collections) would be used where appropriate and as specified by BLM to accelerate the redevelopment of sagebrush where canopies have been removed or adversely modified.

6.2 Habitat for Special Status Plant Species

Reclamation of special status plant species habitats may require additional conditions to prevent topsoil from mixing into or percolating through large diameter spoils. Examples may include but are not limited to: topsoil and subsoil separation by protective covering and/or fencing during excavation, spoil crushing and/or compacting prior to topsoil and subsoil replacement, adhesion fabrics or mulch on steep slopes, and restrictions on topsoil storage timeframes.

6.3 Areas of Critical Environmental Concern (ACEC) and Remnant Vegetation Associations (RVA)

Within RVAs and identified ACECs (i.e., those containing special status plant species), the following additional conditions apply:

- In order to maintain genetic integrity, native seed must be collected prior to construction operations or disturbance. Native seed will be collected utilizing established standards put forth and provided by the Association of Official Seed Certifying Agencies (www.AOSCA.org).

- If native seed production is insufficient to allow collection of an adequate quantity of seed after three consecutive growing seasons, then the operator may request authorization to use an alternate seed mix that resembles the desired native plant community as closely as possible. Any alternate seed mix must be approved, in writing, by the AO after appropriate environmental analysis is conducted.

7.0 Supplemental Information

7.1 Acronyms

ACEC	Areas of Critical Environmental Concern
AIM	Assessment, Inventory, and Monitoring Protocol
AO	Authorized Officer
API	American Petroleum Institute
APD	Application for Permit to Drill
BLM	Bureau of Land Management
BMP	Best Management Practice
CDPHE	Colorado Department of Health and Environment
CFR	Code of Federal Regulations
COA	Condition of Approval
DPC	Desired Plant Community
ESD	Ecological Site Descriptions
FAN	Final Abandonment Notice
FLPMA	Federal Lands Policy and Management Act of 1976
GIS	Geographic Information System
GPS	Global Positioning System
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service (USDA Federal Agency)
OHV	Off-highway vehicle
PAR	Pesticide Application Reports
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
ROD	Record of Decision

1	ROW	Rights of Way
2	RS	Remote Sensing
3	RVA	Remnant Vegetation Association
4	SUP	Surface Use Plan
5	TN	Technical Note
6	TPH	Total Petroleum Hydrocarbons
7	USDA	United States Department of Agriculture
8	UTM	Universal Transvers Mercator
9	WRFO	White River Field Office

10

7.2 Contact Information

Phone: (970) 878-3800

All inquiries should be sent to the WRFO:

Attn: [name of project lead]
Bureau of Land Management
White River Field Office
220 East Market Street
Meeker, CO 81641

7.3 References

Bureau of Land Management (BLM) 1998a. Measuring and Monitoring Plant Populations. Elzinga C. L., D. Salzer, and J. Willoughby. Technical Reference 1730-1. U.S. Department of the Interior National Applied Resource Sciences Center. BLM/RS/ST-98/005+1730.

BLM 2008. Handbook 1740-2 Integrated Vegetation Management. Bureau of Land Management Rel. 1-1714. March 25, 2008.

Colorado Greater Sage-Grouse Steering Committee. 2008. Colorado Greater Sage-Grouse Conservation Plan. Colorado Division of Wildlife, Denver, Colorado, USA.

MacKinnon, W.C., J.W. Karl, G.R. Toevs, J.J. Taylor, M. Karl, C.S. Spurrier, and J.E. Herrick. 2011. BLM Core Terrestrial Indicators and Methods. Technical Note 440. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.

U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS). 1976. Davis R.M. National Range Handbook. July 1976.

7.4 Glossary

Best Management Practice (BMP): BMPs are state-of-the-art mitigation measures designed to provide for safe and efficient operations while minimizing undesirable impacts to the environment.

Desirable species/desirable vegetative groundcover: Include those plant species defined by the range site, from the BLM approved seed mix, or other desired species found in the surrounding areas (approved by the BLM).

Desired Plant Community (DPC): DPCs are plant community types composed of desirable species that occupy an ecological site to meet management objectives and provide at least the minimum qualitative and quantitative criteria for the soil, water, air, plant, and animal resources.

Drilling: A drill rig is present and in the act of drilling for placement of surface casing and or production casing.

Ecological Reference Area: A landscape unit in which ecological processes are functioning within a normal range of variability and the plant community has adequate resistance to and resiliency from most disturbances. These areas do not need to be pristine, historically unused lands (e.g. climax plant communities or relict areas) (Pellant et al. 2000). Ecological reference areas are lands

that best represent the potential of a specific ecological site in both physical function and biological health. In many instances potential ecological reference areas are identified in Ecological Site Descriptions and are referred to as “type locations”.

Ecological Site: A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Ecological Site Description: Describes physiographic features, climate features, influencing water features, representative soil features, and plant communities (including information about state and transition of plant communities) for the ecological site. Information common for plant communities can include community narratives, annual production, species composition, growth curves, cover and structure, and photos. This system describes what is possible for a particular reclamation site and also allows for the updating of the site descriptions as new information becomes available.

Effective Rooting Zone: Effective rooting depth is the rooting zone or depth where plants obtain most of their water and nutrients. Approximately 80 percent of a given plant’s root system is found within this zone. The depth of the effective rooting zone varies by plant species, soil type and local depths to bedrock.

Final Reclamation: Reclamation of an area (not planned for further disturbance) including recontouring, stabilization of soils, and establishment of vegetation representative of the DPC in a healthy early seral state that will allow progression toward the climax community.

Growing Season: Growing season is the portion of the year when temperatures and moisture permit plant growth. The growing season for the WRFO is defined as the period between the last frost of spring and the first frost of autumn, which varies with elevation. In the WRFO this period generally begins in April and may continue into September depending on elevation.

Interim Reclamation (Phase I/II): Reclamation of an area (likely to be redisturbed in the future) including partial recontouring, soil stabilization, and revegetation. This includes sites where final recontouring will be needed at the end of the project and sites where periodic disturbance may occur due to on-going operation and maintenance activities. Phase I interim reclamation generally begins within 24 hours from the time when surface disturbing activities have ended.

On-Site Evaluation: A preplanning meeting to evaluate the site of proposed disturbance, usually attended by the operator, surface owner, BLM, and interested parties.

Range Site: A range site is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind or proportion of species or in total production. (see *National Range Handbook, Soil Conservation Service, USDA, 1976*).

Reclamation: The result of activities implemented to provide: surface and subsurface stability and a functioning plant community of desirable perennial vegetative cover that is capable of persisting and is compatible with or complements BLM established land management objectives. Vegetation will be representative of the range site or Desired Plant Community and allow for successional processes that allow progression toward the climax vegetative community expected for that range site.

1 **Reclamation Plan:** A plan submitted by the operator as outlined in the Revised Onshore Order
2 Number 1 effective May 7, 2007. The Plan is a dynamic document that defines and explains the
3 extent and timing of actions taken to contribute to the eventual restoration of the disturbed site to its
4 natural undisturbed potential.

5 **Restoration:** Implementation of a set of actions that promotes plant community diversity and
6 structure that allows plant communities to be more resilient to disturbance and invasive species over
7 the long term.

8 **Revegetation:** Establishing or re-establishing desirable plants in areas where desirable plants are
9 absent or of inadequate density, by natural revegetation or by seeding or transplanting (artificial
10 revegetation).

11 **Soil Productivity:** Soil productivity is defined as the capacity of a soil for producing a specified
12 plant or sequence of plants under a specified system of management. For reclamation, soil
13 productivity is the effectiveness of the seed bed to propagate the reclamation seed mix.

14 **Surface Disturbing Activities:** An action that alters the vegetation, surface/near surface soil
15 resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects
16 other Public Land values. Examples of surface disturbing activities may include: operation of heavy
17 equipment to construct well pads, roads, pits and reservoirs, installation of pipelines and power
18 lines, or vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either
19 authorized or prohibited. *Wyoming Information Bulletin 2007-029, Guidance for Use of*
20 *Standardized Surface Use Definitions.*

21 **Surrounding Area:** The variable area of influence (generally within 330 feet) associated with a
22 disturbance that, if infested by noxious or undesirable invasive weeds, could serve as a seed source
23 to infest or re-infest the disturbed area.

24 **Topsoil:** For the purpose of this document topsoil is considered the surface soil, usually
25 corresponding with the O and A, and sometimes B horizons that contain the greatest amount of
26 organic matter, biological activity, and nutrients. Depths vary by location. Topsoil is distinguished
27 from subsoil as the most favorable material for establishment of seeded species and plant growth. It
28 is used to top-dress areas of previous disturbance.

29 **WRFO Geospatial Data Submission Standards:** Geospatial (GIS/GPS/RS) data submitted to
30 White River Field Office (WRFO) shall be in a format compatible with the WRFO's Geographic
31 Information System (GIS). Acceptable data formats are: (1) ESRI shapefiles or geodatabases and
32 (2) AutoCAD .dwg or .dxf files. Option 1 is highly preferred, but in the case of engineering
33 drawings, both Options 1 and 2 are required. AutoCAD submission must include, or be constructed
34 with, spatial referencing (defined below) similar to standard GIS data for direct incorporation into
35 WRFO data models. Data must be submitted in UTM Zone 13N, NAD83 in units of meters, and
36 vertical datums must be specified. Data may be submitted as: (a) an email attachment; or (b) on a
37 standard compact disk (CD) in uncompressed (preferred) or compressed (WinZip only) format. All
38 submitted data shall include metadata that includes collection methods (e.g., type of GPS),
39 accuracy, field notes, etc. and conforms to the Content Standards for Digital Geospatial Metadata
40 from the Federal Geographic Data Committee standards. Alternatives to the stated submittal
41 requirements may be approved on a case-by case basis. Questions should be directed to WRFO
42 BLM GIS staff at 970-878-3800.

This page intentionally left blank